

ADVISORY COMMITTEE ON THE MICROBIOLOGICAL SAFETY OF FOOD**EPIDEMIOLOGY OF FOODBORNE INFECTIONS GROUP (EFIG)**

1. The group met on 6 December 2016 and the following is a combined summary of the animal and human data and other topics that were discussed at the meeting.

Animal data**Animal *Salmonella* data January – September 2016 (provisional data)**

2. Key points from the January – September 2016 data were highlighted. The data were provisional and related to numbers of incidents rather than flocks or herds. The annual Animal and Plant Health Agency (APHA), reports on *Salmonella* in livestock provide further details including the reasons for collection of this data. The latest report (2015) is available at:
<https://www.gov.uk/government/publications/salmonella-in-livestock-production-in-great-britain-2015>
Although not presented here, some data is available for other pathogens from clinical diagnoses of non-statutory zoonoses and from other infections shared between animals and humans from specimens submitted to APHA and Scotland's Rural College (SRUC) laboratories.
3. An isolation is defined as the report of the first isolate of a given *Salmonella* (defined by serovar, and/or phage type, if available) from the same group of animals on a given occasion. If two submissions from the same group of animals on different dates give the same serovar, this is reported as two isolations. An incident comprises the first isolation and all subsequent isolations of the same serovar or serovar and phage/definitive type combination of a particular *Salmonella* from an animal, group of animals or their environment on a single premises, within a defined time period (usually 30 days).
4. Between January and September 2016, there were 734 reports of *Salmonella* from livestock, which is 10% fewer than during the same period in 2015 (815 reports) and 14% fewer than during the same period in 2014 (849 reports). The decline since 2015 is largely attributable to a decrease in *Salmonella* reports from ducks (144 incidents vs. 217 incidents) and cattle (206 incidents vs. 237 incidents).
5. There were 4 reports of *S. Enteritidis* during January – September 2016 compared with nine during January – September 2015.
6. Reports of *S. Typhimurium* (81 reports) have increased by 5% compared with the same period in 2015 but decreased by 23% compared with the same period in 2014 (105 incidents). The most common phage types were DT2, DT104 and U288.
7. Reports of monophasic *Salmonella* 4,5,12:i:- increased by 21% (47 vs. 39 incidents) compared with January – September 2015, whilst reports of *Salmonella* 4, 12:i: decreased by 49% (24 vs 47 incidents). The most common phagetype was DT193 which accounted for 63 of the 71 incidents (89%).

8. There were 9% fewer APHA/SRUC submissions to VIDA between January and December 2016 (48,017 submissions) compared with January – September 2015 (52,674 submissions) and 18% fewer compared to the same period of 2014 (58,341 submissions). Much of the decrease relative to 2015 was attributable to fewer submissions from cattle (16% fewer), pigs (5% fewer) and sheep (2% fewer).
9. On the non-statutory zoonoses, in April 2016 APHA investigated a large outbreak of *Cryptosporidium parvum* and VTEC O157 in visitors to an open farm in the North of England. In total, 33 confirmed cases of cryptosporidiosis were identified, with a further 13 probable or secondary cases also detected. There were four confirmed cases of VTEC O157 infection, with a further five probable or secondary cases also identified. The strain of VTEC identified in the human cases was VTEC O157 PT 21/28. However, only a single cattle sample tested positive for *E coli* O157 and this was further identified as VTEC O157 PT 54, thereby not providing the microbiological evidence required to confirm the farm animals as the source of the VTEC infection in visitors.
10. APHA was also involved in the investigation of an outbreak of 32 cases of VTEC O157 PT34 in a care home in the South of England with onset dates extending back to June 2016. Both residents and staff were affected with some residents hospitalized. The outbreak strain was the same as that of a national outbreak of VTEC epidemiologically linked to bagged salad leaves.
11. Incidents of *Listeria* recorded on VIDA showed a large increase in cases in sheep (140 incidents between January and November) compared to the number of cases in 2015 (85 incidents).

National Control Programmes for *Salmonella* in chickens in the UK

12. It was highlighted that the National Control Programmes (NCP) for *Salmonella* in poultry is monitored per calendar year and the results for 2015 were reported to EFSA at the June 2016 meeting.
13. It was reported that the 2016 programme is progressing well without any serious outbreaks, and current reports are well below the EU targets of 1% (2% for laying hens) for the regulated serovars (*S. Enteritidis*, *S. Typhimurium* and its monophasic forms) for each of the 5 NCP's. Of note was a positive *S. Typhimurium* DT85 in June in a flock of broiler breeders. It was stated that the birds were culled and not put into the human food chain, and there has been no evidence of spread down the pyramid into meat birds.

Human data - Summary of key pathogens for 2016

Trends in laboratory reports

14. It should be noted these data are provisional from numerous sources therefore caution is required in interpreting trends over time and differences between countries. Data from 2007-2014 for all countries was extracted from the previous

annual EFIG reports. Data for 2015 and 2016 in England for *Listeria monocytogenes* are from the enhanced *Listeria* surveillance database, Shiga toxin producing *Escherichia coli* (STEC) data are from the enhanced STEC surveillance database and foodborne outbreak data are from the enhanced foodborne outbreaks surveillance system, all of which are Public Health England's databases. *Campylobacter* and *Salmonella* data for England for 2015 and 2016 were extracted from returns sent to the European Centre for Disease Control. Wales, Scotland and Northern Ireland 2015 *Campylobacter* and *Salmonella* data were extracted from the December 2015 EFIG report.

15. Figures 1-6 show the trends in laboratory reports for non-typhoidal *Salmonella*, *Campylobacter*, *Listeria monocytogenes* and STEC O157 in the UK for the first three quarters (January–September) 2007-2016. Overall reporting rate of *Salmonella* and STEC O157 has increased, *Campylobacter* has decreased and *Listeria monocytogenes* has remained relatively stable.

***Salmonella* infections**

16. There were 7063 reports of non-typhoidal *Salmonella*, an increase of 5.7% from the 6660 reported in quarters 1-3 2015. An increase in the reporting rate was seen in all constituent countries. The overall number of reported infections increased in the UK by 403, the majority of which (304) were in England. The increase is due partly to an increase in S.Typhimurium. It was highlighted that due to a change in laboratory reporting, data for 2015 and 2016 for England and Wales now include untyped *Salmonella* spp.
17. Reports of S.Enteritidis decreased in the UK, predominately due to the decrease in England (128 cases). Increases were seen in Scotland (46 cases) and Wales (8 cases) and a decrease in Northern Ireland (6 cases).
18. Laboratory confirmed caes of S.Typhimurium increased from quarters 1-3 2015 to 1-3 2016, from 1261 to 1439 respectively. This increase was primarily due to the rise in England; reported cases remained the same in Scotland, decreased in Wales (9 cases) and increased in Northern Ireland (16 cases).
19. The mostly commonly reported *Salmonella* serovar in the UK for quarters 1-3 2016 was Enteritidis, however more cases of Typhimurium than Enteritidis were reported in Northern Ireland. Enteritidis and Typhimurium combined make up half of the reported *Salmonella* cases. Constituent countries have similarities in the other most commonly reported serovars with only S.Hadar, S.Java, S. Orannienburg, S.Saint-Paul and S.Kentucky making the top-10 reported serovars in only one country (England).

Figure 1. Rate of reported non-typhoidal *Salmonella* infections by country per 100,000 population for quarters 1-3, 2007-2016

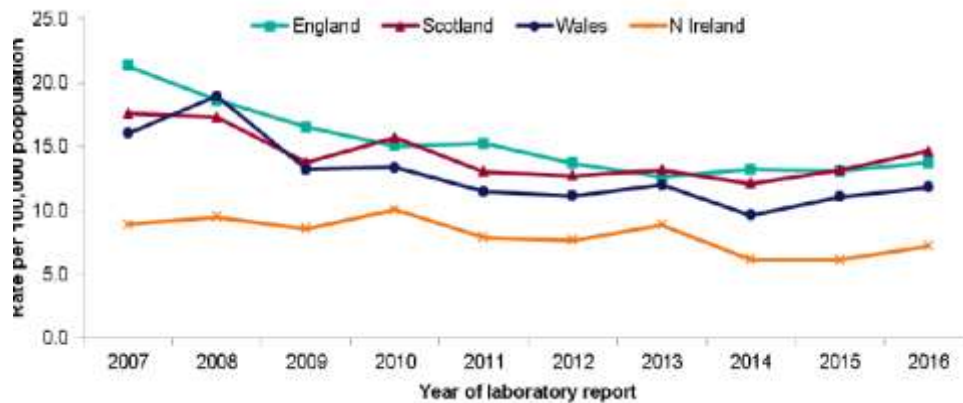


Figure 2. Rate of reported *Salmonella* Enteritidis infections in the United Kingdom and by nation per 100,000 population for quarters 1-3, 2007-2016

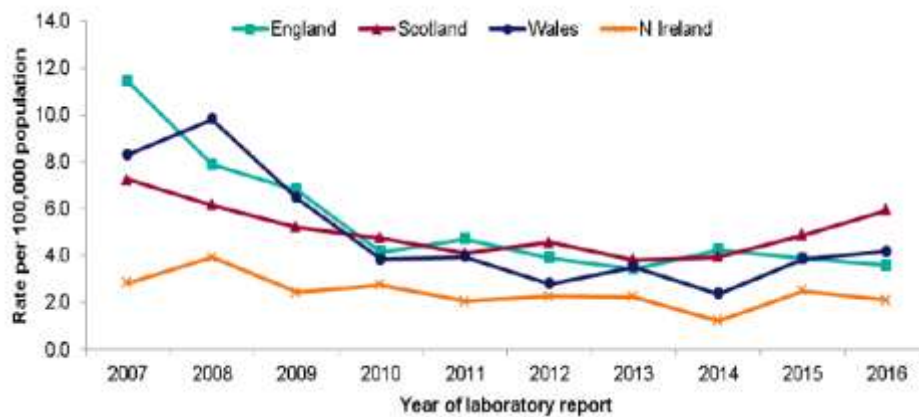
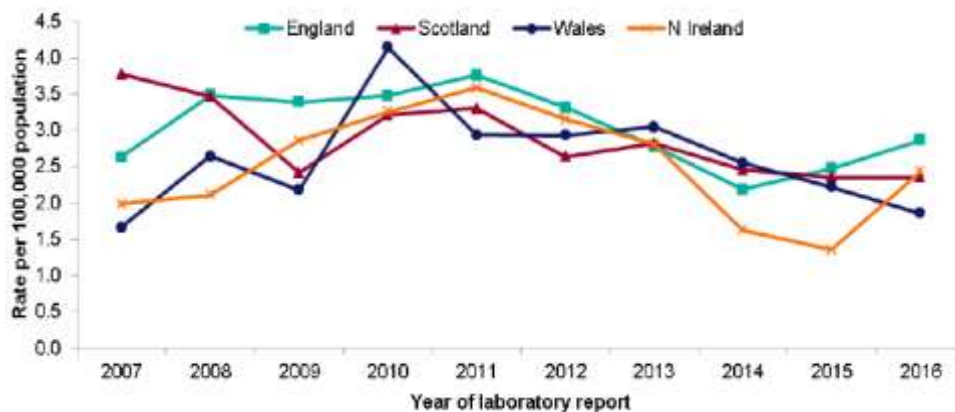


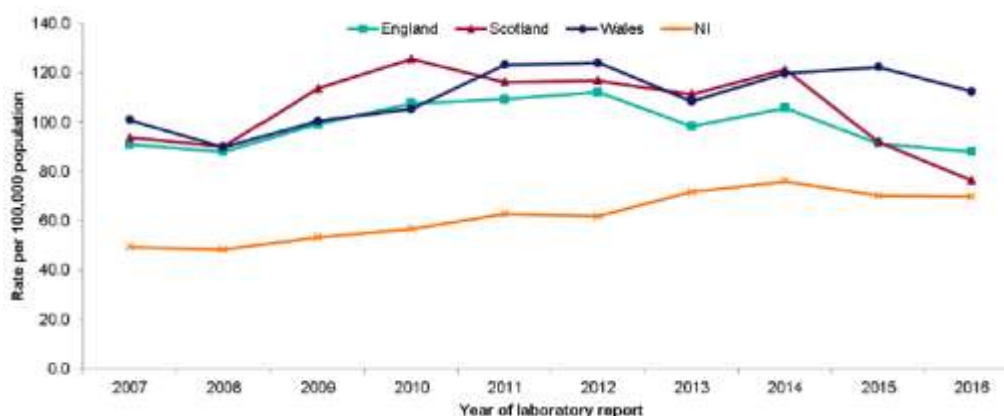
Figure 3. Rate of reported *Salmonella* Typhimurium infections by country per 100,000 population for quarters 1-3, 2007-2016



Campylobacter infections

20. The reporting rate for *Campylobacter* has decreased in the UK from 94.2 per 100,000 population in quarters 1-3 of 2015 to 89.1 per 100,000 in quarters 1-3 in 2016. The rate of reported *Campylobacter* infections in England and Scotland have decreased to the lowest rate reported in the last ten years. Wales reported a decrease from quarters 1-3 2015 to 2016, however still reports the highest rate of all UK countries (112.3 per 100,000 population). Northern Ireland continues to report rates lower than the rest of the United Kingdom.

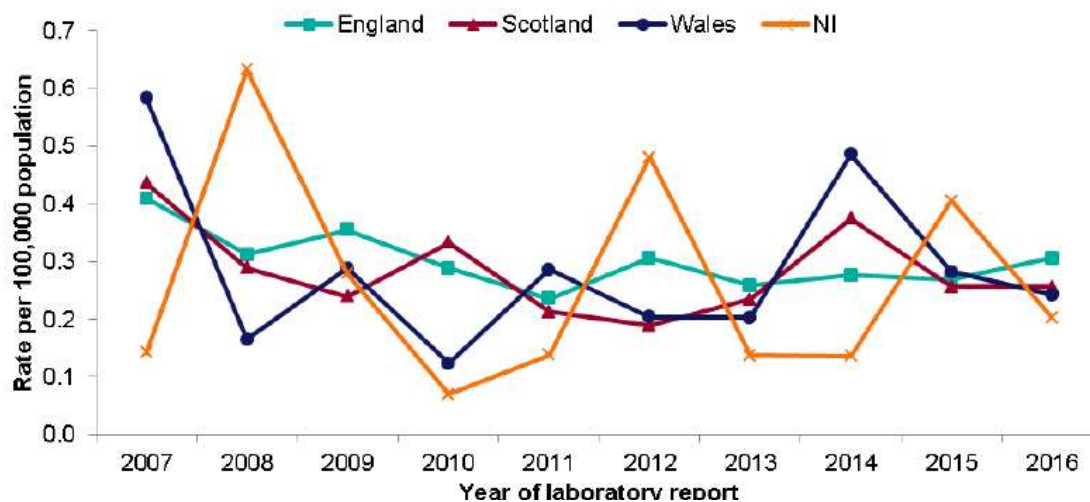
Figure 4. Rate of reported *Campylobacter* infections by country per 100,000 population for quarters 1-3, 2007-2016



Listeria monocytogenes infections

21. The number of *Listeria monocytogenes* cases in the UK has remained relatively stable since 2008, however small numbers limit meaningful trend interpretation. England reported 16 additional cases in quarters 1-3 in 2016 compared to the same period in 2015.

Figure 5. Rate of reported *Listeria* infections by country per 100,000 population for quarters 1-3, 2007-2016



STEC infections

22. STEC O157 incidence increased in 2016 after a decrease between quarters 1-3 2014 and 2015. Increases were seen in England (64 cases), Scotland (21 cases) and Northern Ireland (25 cases). The reporting rate in Wales is consistent with 2015.

23. PHE has applied the Farrington flexible algorithm to the national enhanced surveillance system reported by STEC cases between 2009 and 2015 to detect exceedances in exposures reported by cases. This was presented to the FSA on the 18th November and will complement the existing process of alerting the FSA to outbreaks linked to rare burgers that are reported to PHE. This system will require a period of piloting under the guidance of PHE statisticians and the colleagues at the University of Warwick

Figure 6. Rate of reported STEC O157 infections by country per 100,000 population for quarters 1-3, 2007-2016

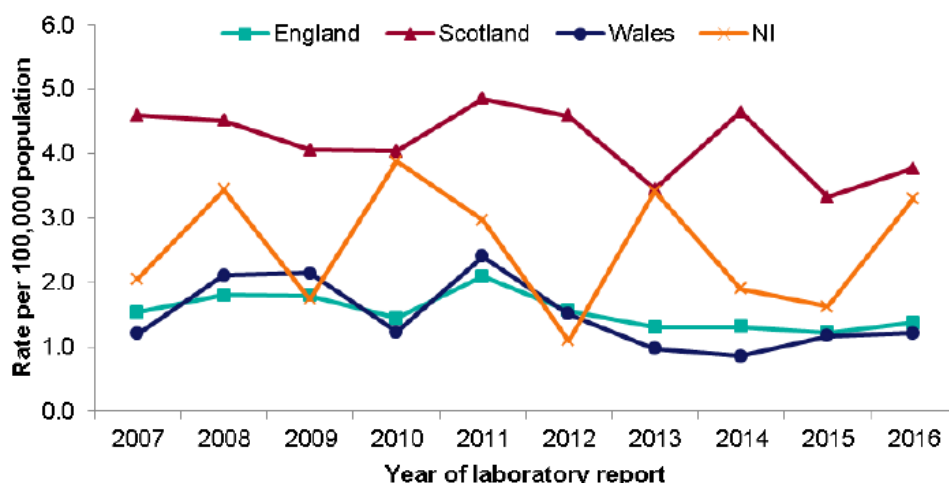


Table 1. Number of the most commonly reported STEC infections by serogroup in the United Kingdom and by country for quarters 1-3, 2016

Serotype	England	Wales	Scotland	Northern Ireland	United Kingdom
O157	600	30	162	49	841
O26	35	0	12	30	65
O146	26	0	3	0	26
O91	23	0	2	0	23
O128	17	0	3	0	17
O103	10	0	4	0	10
O145	9	0	1	1	10
O55	9	0	0	0	9
O76	8	0	1	0	8

*Testing for non-O157 VTEC infections varies by laboratory; totals presented do not represent the prevalence of infections in the population.

Foodborne Outbreaks

24. In quarters 1-3 2016, 31 foodborne outbreaks were reported to eFOSS in England and Wales and to Health Protection Scotland. There were no foodborne outbreaks reported from Northern Ireland during the period. There were 848 cases (374 of which were laboratory confirmed), and 94 reported hospitalisations. The high number of hospitalisations is due in part to 66 hospitalisations in a large national outbreak of STEC O157 PT34. *Campylobacter* and *Clostridium perfringens* were the most frequently implicated or suspected causative agents in reported foodborne outbreaks (6/31, 19%). The majority of foodborne outbreaks occurred in the food service sector (18/31, 58%)

Table 2. Number of foodborne outbreaks attributed to specific pathogens reported in the UK for quarters 1-3, 2016

Year	England and Wales	Scotland	Northern Ireland	United Kingdom*
S. Enteritidis	1	2	0	3
S. Braenderup	1	0	0	1
<i>Campylobacter</i>	7	0	0	7
<i>C. perfringens</i>	7	0	0	7
STEC O157	1	1	2	4
<i>Cryptosporidium</i>	1	0	0	1
Norovirus	5	0	0	5
Other/Unknown	3	0	0	3

Antimicrobial resistance

25. Members received an update on recently published information on antimicrobial resistance (AMR):

26. A systematic review of the available evidence on AMR in food

The review looked at research on the presence of AMR in bacteria in a number of different foods sold at retail.

<https://www.food.gov.uk/news-updates/news/2016/15746/fsa-publishes-review-of-antimicrobial-resistance-evidence>

27. FSA Chief Scientific Advisor's Report on AMR

<https://www.food.gov.uk/news-updates/news/2016/15523/challenges-of-antimicrobial-resistance>

28. Government response to the Independent Review on AMR

The FSA was listed as joint lead department with Defra on two areas: in its role as UK lead on food safety issues in Codex Alimentarius where, at the request of the Codex Alimentarius Commission, the FSA (jointly with Australia and the US) convened a working group (week of 28 November 2016) to set the terms of reference for a subsequent intergovernmental task force on AMR; and working to encourage the adoption of clear transparent reporting standards that help consumers

have access to and understand information about the responsible use of antibiotics in the food chain.

<https://www.gov.uk/government/publications/government-response-the-review-on-antimicrobial-resistance>

29. UK-Veterinary AMR and sales Surveillance Report

<https://www.gov.uk/government/publications/veterinary-antimicrobial-resistance-and-sales-surveillance-2014>

30. Update on the activities of the Committee for Medicinal Products for Veterinary Use

The Antimicrobial Advice ad hoc Expert Group (AMEG)'s updated its scientific advice to the European Commission on: *The use of colistin in animals in the EU: development of resistance and possible impact on human and animal health* was published on the European Medicines Agency's (EMA) website on 27 July 2016, and is available at the following link: http://www.ema.europa.eu/ema/index.jsp?curl=pages/news_and_events/news/2016/07/news_detail_002579.jsp&mid=WC0b01ac058004d5c1

Estimating the burden of gastrointestinal disease in Scotland: new opportunities using data linkage

31. FIG received a presentation from Helen Benson (Health Protection Scotland) on the above ongoing study funded by HPS and National Health Service Scotland. The aims and objectives of the study are:

- To quantify the burden of disease in Scotland from 9 gastrointestinal pathogens: *Campylobacter*, *Salmonella*, *Shigella*, VTEC, *Listeria*, Hepatitis E, Hepatitis A, *Cryptosporidium* & *Giardia*
- To achieve a better understanding of:
 - The distribution of disease burden in the Scottish population
 - The incidence of sequelae
 - The association between risk factors and disease outcomes

32. The study's anticipated outcomes are:

- A better understanding of:
 - how the burden of gastrointestinal disease is distributed in the Scottish population
 - risk factors including predisposing conditions
 - incidence of sequelae and complications
 - trends in risk factors and burden of disease over time
- Data on number of hospitalisations, stays lengths and specialities visited can be used to derive cost estimates for gastrointestinal disease

33. The areas covered in the presentation include the study's methods, generic linkage timeline, the study limitations, implications and further research. Some of the study's initial findings were shared with the group. It is anticipated that the findings of the completed study would be presented to EFIG in June 2017.

FSA Survey of *Campylobacter* on Fresh Chicken Bought at Retail Outlets

34. Previous update to EFIG (in June 2016) highlighted that the above survey was temporarily suspended whilst the survey contractors (PHE) undertook a trial to determine a more robust methodology with regards to the sampling site on whole chicken samples.

35. It was reported that findings from the trial revealed that valid results could be obtained by continuing to sample chicken neck skin but in smaller quantities (5-10g rather than 25g) and not supplemented with additional breast skin. The full report from the trial period is expected to be published by January 2017 as part of the final Year 2 survey report.

36. Apart from this small change in the laboratory methodology, the rest of the protocol remained the same, and any future publications for the Year 3 survey should be comparable to that of Year 2, with the same banding of results (i.e. <10 cfu/g, 10-99 cfu/g, 100-1000 cfu/g, and >1000 cfu/g).

37. The new laboratory protocol is being used for Year 3 of the survey that commenced in August 2016. The first results from Year 3 (covering the period August 2016-December 2016) will be published in February 2017 under the standard format including a breakdown of results attributed to the major retailers.

Food Surveillance

38. PHE updated the group on their Food, Water & Environmental Microbiological Services reconfiguration and drew attention to recent publications from their food liaison group studies which include:

- Detection of Livestock-Associated MRSA in raw meat on retail sale in North West England.
- An assessment of the microbiological safety of lightly cooked food from retail premises in the United Kingdom.
- An assessment of the microbiological quality of liver-based pâté in England 2012-13: comparison of samples collected at retail and from catering.
- An assessment of the microbiological safety of duck eggs in England with a focus on *Salmonella* spp.
- Evaluation of meat, fruit and vegetables from retail stores in five United Kingdom regions as sources of extended-spectrum beta-lactamase (ESBL)-producing and carbapenem-resistant *Escherichia coli*.

39. PHE's current national studies and future projects include:

- Hygiene in Catering Premises (January –November 2016)

- Hygiene of sauce bottles and pots that are topped up and kept at ambient (November 2016–March 2017)

40. Ongoing ad hoc monitoring

- Betel leaves and *Salmonella*

41. Future grant funded projects are:

- To develop methods to identify environmental reservoirs of *S. Typhi*, and use these findings to inform targeted intervention strategies through spatial modelling. Bill & Melinda Gates Foundation
- European, multi-centre, prospective prevalence pilot-study of *Cronobacter sakazakii* infections in humans (EUCRONI). EU Funding.

42. Public Health Wales updated the group on the activities of the Welsh Food Microbiological Forum (WFMF). The WFMF is a collaboration of public health organisations and local authorities in Wales with the aim of improving the microbiological quality of food available to consumers in Wales. The WFMF initiates and takes part in food surveys unique to Wales and in national food surveys. Reports are generated from all the survey work to help inform the activities of Local Authorities in Wales and the Food Standards Agency. A list of recent and future surveys was provided.

43. Food Standards Scotland reported that food surveillance sampling for 2016/17 begin in July 2016 and will continue until March 2017. These sample results will be updated to the UK Food Surveillance System by May 2017. An overview of the results of food sampling undertaken in 2015/16 was provided. A total of 8671 samples, were submitted to the UKFSS database. 4973 were submitted for microbiological analysis with 88.1% of samples satisfactory and 3698 were submitted for chemical analysis and of these 93.6% were satisfactory. It was reported that there has been a consistent increase in the percentage of satisfactory samples over the past three years.

Action

44. ACMSF Members are invited to comment on the recent trends in animal and human data and other subjects discussed by EFIG at the December 2016 meeting.

Secretariat
January 2017